REMARKS

Reconsideration of the application is requested in view of the modifications above and the remarks below.

1. Rejection Under 35 USC 112, second paragraph

The Office Action rejected Claims 4 and 15-20 under 35 USC 112, second paragraph. In view of the modifications above, the rejection is believed overcome. Reconsideration is requested.

2. Rejection Under 35 USC 103

The Office Action rejected Claims 1-20 under 35 USC 103 over Geiger et al, Influence of Sulphur on the Formation of Dioxin/Furan during Sewage Sludge Incineration (English Translation, hereinafter "Geiger") and U.S. Pat. No. 5,968,467 (Karasek). The rejection should be withdrawn in view of the remarks below.

It is well established that to establish a *prima facie* case of obviousness, the USPTO must satisfy all of the following requirements. First, the prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or to combine references. *In re Fine*, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Second, the proposed modification must have had a reasonable expectation of success, as determined from the vantage point of one of ordinary skill in the art at the time the invention was made. *Amgen v. Chugai Pharmaceutical Co.* 18 USPQ 2d 1016, 1023 (Fed Cir, 1991), *cert. denied* 502 U.S. 856 (1991). Third, the prior art reference or combination of references must teach or suggest all of the limitations of the claims. *In re Wilson*, 165 USPQ 494, 496, (CCPA 1970). The Office Action did not establish a *prima facie* case of obviousness.

Applicants' invention is based on the surprising discovery that by practicing a specific combination of steps, the formation of dioxins ordinarily produced in disposal processes, e.g., thermal disposal processes, can be substantially reduced, and dioxin emissions can also be diminished to very low levels (See page 4, third full paragraph). Surprisingly, dioxin formation is substantially reduced when a halogenation suppressant such as sulfur is added to a composition that contains dioxin precursors. Applicants' invention requires the combined use of sulfur and

powdered activated carbon injection, within a suitable temperature range, e.g., a controlled temperature range of 0°C and 200°C. The synergy of these steps outperforms the additive steps of sulfur and Powder Activated Carbon (PAC) injection, irrespective of the temperature range.

More particularly, Applicants' invention relates to a method that involves (a) adding sulfur, or another halogenation suppressant, or mixtures thereof to a composition containing dioxin precursors, (b) incinerating the composition containing dioxin precursors, thereby forming a gaseous medium, (c) reducing heat in the gaseous medium formed in step (b), (d) removing ash from the gaseous medium, (e) adding an adsorbent to the gaseous medium formed in step (d), and (f) removing acid gases and particulates from the gaseous medium formed in step (e). In one embodiment, the dioxin precursors are aromatic compounds selected from phenols, benzene, and chlorinated aromatic compounds. In another embodiment, Applicants' invention is a method that (a) adds sulfur, or another halogenation suppressant, or mixtures thereof to a composition containing dioxin precursors that comprises (i) a wastewater treatment sludge, (ii) solid organic residues and (iii) a mixture of halogenated solvents, (b) incinerates the composition containing dioxin precursors at a temperature that is at least about 800°C, thereby forming a gaseous medium, (c) reduces heat in the gaseous medium formed in step (b) to a temperature that is below about 200°C, (d) removing ash from the gaseous medium, (e) adds activated powder to the gaseous medium formed in step (d) at a rate that is at least about 0.0007 kg, per about 100 m^3 of gaseous medium, and (f) removes acid gases and particulates from the gaseous medium formed in step (e). Applicants' invention also encompasses other embodiments, as indicated in the pending claims.

Geiger teaches the sulfur addition to reduce Dioxin/Furan Formation. Namely, at the Document Summary Paragraph of the English translation, Geiger teaches that the PCDD/PCDD concentrations adjusted in the dusts show a clear increase in the formation rate, without SO_2 addition, independently of the HCl content in the flue gas. By adding SO_2, the dioxine furan formation reduces regressively with increasing S/Cl ratio, above which the PCDD/PCDF formation is independent of the HCl content in the flue gas.

One of ordinary skill in the art following the teachings of Geiger would not

have been motivated to modify Geiger, practice Applicants' invention, and expect the results Applicants have obtained. Geiger fails to provide any teaching that would have motivated one of ordinary skill in the art to modify Geiger, practice Applicants' invention and expect that the combined use of sulfur and powdered activated carbon injection would produce the results Applicants have obtained.

In Comparison Example C, Table 2, for instance, the specification shows that the use of sulfur addition alone produced an average value of dioxin Toxic Equivalent (TEQ) of 1.42, well above the targeted goal of a polychlorinated dibenzo-dioxins and polychlorinated dibenzofuran (D/F) emission rate of less than 0.4 of the average value of dioxin Toxic Equivalent (TEQ). By contrast, when sulfur was used in combination with powdered activated carbon injection, Applicants' invention produced excellent results. Surprisingly, the combination of sulfur and powder activated carbon, as shown Table 1, enabled Applicants to achieve the results 0.18 TEQ to 0.29. Geiger does not contain any teaching that would be suggestive of such results. Reconsideration is requested.

Karasek does not overcome the deficiencies of Geiger. Karasek teaches a method for preventing the formation of dioxins in an incinerator that incinerates chlorine-containing waste. Geiger's method involves impregnating an adsorbent for chlorinated aromatic hydrocarbon precursors of dioxins with an alkaline substance, (thereby creating an alkaline substance-impregnated adsorbent); and contacting the alkaline substance-impregnated adsorbent with a volume of exhaust gas generated by the incinerator, at a temperature above 400°C, so that the chlorinated aromatic hydrocarbon precursors of dioxins are thereby removed from the exhaust gas at a time before said chlorinated aromatic hydrocarbon precursors are converted to dioxins (See Summary of Invention, Claim 1).

Geiger, singly or in combination with Karazek, would not have been motivated to modify Geiger, practice Applicants' invention, and expect the results Applicants have obtained. Geiger, singly or in combination with Karazek, does not contain any teachings that would have made one of ordinary skill in the art expect the results Applicants have obtained. Karazek addresses PAC injection in the removal of precursors to D/F formation. Applicants' invention does not target the D/F precursors, but D/F itself. Karasek teaches in his abstract that a dioxin preventative

includes an adsorbent that sorptively removes dioxin precursors from an exhaust gas stream of an incinerator at a point prior to the exhaust gas stream cooling to below a temperature of 400 °C. Karasek is attempting to stop the "formation" of D/F, by removing its "building blocks", a.k.a. precursors, before D/F can be formed. In other words, Karazek is fundamentally different from Applicants' invention. Further, one of ordinary skill in the art would not have combined Karazek and Geiger, as alleged by the Office Action. The two references are directed to fundamentally different inventions and are incompatible with each other. Reconsideration is requested.

Accordingly, Geiger, singly or in combination with Karazek, coupled with the knowledge generally available in the art at the time of the invention, does not contain some suggestion or incentive that would have motivated the skilled artisan to make Applicants' invention by modifying Geiger or combining Geiger and Karazek, as alleged by the Office Action. The proposed modification alleged by the USPTO does not have a reasonable expectation of success, as determined from the vantage point of one of ordinary skill in the art at the time the invention was made that Geiger, singly or in combination with Karazek, does not teach or suggest all of the limitations of the pending claims. Applicants request that the USPTO acknowledge the differences that exist between their invention and those inventions taught by Geiger and Karazek, and withdraw the rejection under 35 USC 103.

In view of the foregoing amendments and remarks, allowance of Claims 1-20 is earnestly requested.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE:

IN THE CLAIMS:

The claims have been amended as follows:

4. The method of Claim 1, wherein the composition containing dioxin precursors comprises at least one selected from the group consisting of (i) a wastewater treatment sludge (ii) solid organic residues and (iii) a mixture of chlorinated solvents.

15. A method comprising:

(a) adding sulfur, or another halogenation suppressant, or mixtures thereof to a composition containing dioxin precursors that comprises at least one selected from the group consisting of (i) a wastewater treatment sludge (ii) solid organic residues and (iii) a mixture of halogenated solvents,

(b) incinerating the composition containing dioxin precursors at a temperature that is at least about 800°C, thereby forming a gaseous medium,

(c) reducing heat in the gaseous medium formed in step (b) to a temperature that is below about 200°C,

(d) removing ash from the gaseous medium,

(e) adding activated powder to the gaseous medium formed in step (d) at a rate that is at least about 0.0007 kg, per about 100 m^3 of gaseous medium,

(f) removing acid gases and particulates from the gaseous medium formed in step (e).